CLAIMS

What is claimed is:

1. A fusion implant for insertion between adjacent bony structures, the implant comprising:

a body having opposing sides for contacting the adjacent bony structures; and

at least one member positioned in the body, the member having a first end and a second end, the member having a tapered portion between the first and second ends.

2. The implant of claim 1 wherein at least one of the first and second ends of the member is chamfered.

3. The implant of claim 1 wherein the member is further connected to the body by incorporating a binding agent.

4. The implant of claim 1 wherein the implant is for insertion between the adjacent bony structures in load bearing arrangement, the body having a load bearing axis extending between its opposing sides, the member being tapered in a direction parallel to the load bearing axis.

5. The implant of claim 4 wherein the member extends from a first opposing side partway toward a second opposing side such that the member is exposed at the first opposing side and stops short of the second opposing side.

6. The implant of claim 5 wherein the tapered portion tapers from the first opposing side toward the second opposing side such that the member has a larger end that is exposed and a smaller end that is contained within the body.

7. The implant of claim 1 wherein the member extends through the body from a first opposing side to a second opposing side.

8. The implant of claim 1 wherein the member is embedded within the body, such that it is surrounded on all sides by the body.

9. The implant of claim 8 wherein the body comprises two halves that fit together around the member.

10. The implant of claim 1 wherein the body and the member comprise materials having different mechanical properties.

11. The implant of claim 10 wherein the body comprises a material selected from the group consisting of cancellous bone, cortical bone, uni-cortical bone, bi-cortical bone, tri-cortical bone, demineralized bone, partially demineralized bone, metal, polymer, resorbable polymer, ceramic, and bioglass.

12. The implant of claim 10 wherein the member comprises a material selected from the group consisting of cancellous bone, cortical bone, uni-cortical bone, bi-cortical bone, tri-cortical bone, demineralized bone, partially demineralized bone, metal, polymer, resorbable polymer, ceramic, and bioglass.

13. The implant of claim 10 wherein the body has a portion surrounding the member and one of the portion and member comprises cancellous bone and the other of the portion and member comprises cortical bone.

14. The implant of claim 13 wherein the portion of the body surrounding the member comprises cancellous bone and the member comprises cortical bone.

15. The implant of claim 14 wherein the body further comprises at least one cortical face adjacent the cancellous bone, the cortical face extending between the opposing sides of the body.

16. The implant of claim 10 wherein the body has a portion surrounding the member, the portion surrounding the member being relatively softer than the member, the member being fit into the body such that the portion surrounding the member is deformed to fit closely around the member.

17. The implant of claim 1 wherein the member has a first end having a first cross sectional area and a second end having a second cross sectional area, the first cross sectional area being larger than the second cross sectional area.

18. The implant of claim 17 wherein the member comprises an enlarged head adjacent the first end and a shaft extending from the head to the second end.

19. The implant of claim 1 wherein the opposing sides comprise first and second opposing sides and at least one member extends from each of the first and second opposing sides partway toward the other opposing side, a portion of the at least one member extending from each side overlying a portion of the at least one member extending from the opposite side, the overlying portions being spaced from one another such that a predetermined amount of load induced subsidence of the members is permitted relative to each other within the body.

20. The implant of claim 1 wherein at least one member extends from each of the opposing sides partway toward the other opposing side, each member having a first area for receiving a load from the adjacent bony structures and a second area for transmitting the load to the body.

21. The implant of claim 1 further comprising a fixation device attached to the adjacent bony structures to limit the relative motion between them.

22. The implant of claim 21 wherein the fixation device substantially prevents all relative motion between the adjacent bony structures.

23. The implant of claim 21 wherein the fixation device allows a predetermined amount of relative motion between the adjacent bony structures during the fusion process.

24. The implant of claim 21 wherein the fixation device is selected from the group consisting of plates, internal rod systems, external rod systems, cable systems, cerclage systems, screws, and combinations thereof.

25. A fusion implant for insertion between adjacent bony structures in load bearing arrangement, the implant comprising:

a body comprising bone and having opposing sides for contacting the adjacent bony structures; and

a reinforcing member comprising bone positioned in the body such that the load carrying capacity of the implant is increased, the member having a first end and a second end, the member having a tapered portion between the first and second ends.

26. A fusion implant for insertion between adjacent bony structures in load bearing arrangement, the implant comprising:

a body having opposing sides for contacting the adjacent bony structures; and

a structural member positioned in the body such that the load carrying capacity of the implant is increased, the member having a first end and a second end, the member extending only partway through the body.

27. The implant of claim 26 wherein the member is embedded in the body such that it is surrounded on all sides by the body.

28. A fusion implant for insertion between adjacent bony structures in load bearing arrangement, the implant comprising:

a body having first and second opposing sides for contacting the adjacent bony structures; and

a member positioned in the body, the member having a first end having a first cross sectional area adjacent the first opposing side and a second end having a second cross sectional area spaced toward the second opposing side, the first cross sectional area being larger than the second cross sectional area.

29. The implant of claim 28 wherein the member comprises an enlarged head formed adjacent the first end and a shaft extending from the head toward the second end.

30. A fusion implant for insertion between adjacent bony structures in load bearing arrangement, the implant comprising:

a body having first and second opposing sides for contacting the adjacent bony structures; and

at least one member positioned in the body and extending from each of the first and second opposing sides partway toward the other opposing side, a portion of the at least one member extending from each side overlying a portion of the at least one member extending from the opposite side, the overlying portions being spaced from one another such that a predetermined amount of load induced subsidence of the members is permitted relative to each other within the body.

31. A fusion implant for insertion between adjacent bony structures in load bearing arrangement, the implant comprising:

a body having first and second opposing sides for contacting the adjacent bony structures; and

a member positionable to extend within the body from at least one of the first and second opposing sides, the member having a first surface that receives a load from one of the bony structures and a second surface, oblique to the first surface, that transmits the load to the body.

32. The implant of claim 31, wherein a size of the second surface is greater than a size of the first surface.

33. The implant of claim 31, wherein the member includes a tapered portion.

34. The implant of claim 31, wherein the body further comprises a first load bearing capability, and wherein the member further comprises a second load bearing capability greater than the first load bearing capability.

35. A fusion implant for insertion between adjacent bony structures in load bearing arrangement, the implant comprising:

a body having first and second opposing sides for contacting the adjacent bony structures; and

a member positionable to extend within the body from at least one of the first and second opposing sides, the member having a first portion with a first cross-sectional area that receives a load from one of the bony structures and a second portion with a second cross-sectional area that transmits the load to the body.

36. The implant of claim 35 wherein the first cross-sectional area is larger than the second cross sectional area, the first portion being adjacent one of the first and second opposing sides and the second portion being spaced from the first portion into the body.

37. A fusion implant for insertion between adjacent bony structures in load bearing arrangement, the implant comprising:

a body having first and second opposing sides for contacting the adjacent bony structures;

a first member positionable to extend within the body from one of the first and second opposing sides, the first member comprising a first body having a first end and a second end, wherein the first end is positionable adjacent one of the opposing bony structures, and wherein the first body has a tapered portion between the first and second ends;

a second member positionable to extend within the body from one of the first and second opposing sides, the second member comprising a second body having a third end and a fourth end, wherein the third end is positionable adjacent one of the opposing bony structures, and wherein the second body has a tapered portion between the first and second ends; and

wherein at least a portion of the second member and at least a portion of the first member each lie along a line substantially corresponding to a load bearing axis between the opposing bony structures.

38. The implant of claim 37, wherein the body further comprises a first load bearing capability, and wherein the implant comprises a second load bearing capability greater than the first load bearing capability.

39. A fusion implant for insertion between adjacent bony structures in load bearing arrangement, the implant comprising:

a body having first and second opposing sides for contacting the adjacent bony structures;

a first member positionable to extend within the body from one of the first and second opposing sides;

a second member positionable to extend within the body from one of the first and second opposing sides opposite the first member; and

wherein at least a portion of the first member and at least a portion of the second member each lie along a line substantially corresponding to a load bearing axis between the opposing bony structures, the body having a first area that receives load from the first member and a second area that transmits load to the second member.

40. The implant of claim 39, wherein the first and second members are spaced from one another along the load bearing axis such that a predetermined amount of load induced subsidence of the members is permitted relative to each other within the body.

41. A system for use in fusing adjacent bony structures, comprising:

a body having first and second opposing sides for contacting the adjacent bony structures;

a member positionable to extend within the body from at least one of the first and second opposing sides, the member having a first surface that receives a load from one of the bony structures and a second surface, oblique to the first surface, that transmits the load to the body; and

a fixation device attachable to the adjacent bony structures and having a structure to limit relative motion between the adjacent bony structures.

42. A system for use in fusing adjacent bony structures, comprising:

a body having first and second opposing sides for contacting the adjacent bony structures;

a member positionable to extend within the body from at least one of the first and second opposing sides, the member having a first portion with a first cross sectional area that receives a load from one of the bony structures and a second portion with a second cross sectional area that transmits the load to the body; and

a fixation device attachable to the adjacent bony structures and having a structure to limit relative motion between the adjacent bony structures.

43. A method of treating adjacent bony structures comprising:

providing a fusion implant having a body having opposing sides for contacting the adjacent bony structures and a member positioned in the body, the member having a first end and a second end, the member having a tapered portion between the first and second ends; and

positioning the implant between the adjacent bony structures in load bearing arrangement.

44. The method of claim 43 wherein the implant is positioned such that the member receives a portion of the load from the adjacent bony structures and transmits a portion of the load to the body.

45. A method of treating adjacent bony structures comprising:

providing a fusion implant having a body having opposing sides for contacting the adjacent bony structures and a member positioned in the body, the member having a first end and a second end, the member extending only partway through the body; and

positioning the implant between the adjacent bony structures in load bearing arrangement.

46. A method of treating adjacent bony structures comprising:

providing a fusion implant having a body having first and second opposing sides for contacting the adjacent bony structures and at least one member positioned in the body and extending from each of the first and second opposing sides partway toward the other opposing side, a portion of the at least one member extending from each side overlying a portion of the at least one member extending from the opposite side, the overlying portions being spaced from one another such that a predetermined amount of load induced subsidence of the members is permitted relative to each other within the body; and

positioning the implant between the adjacent bony structures in load bearing arrangement.

47. A method of making a fusion implant for insertion between adjacent bony structures in load bearing arrangement, the method comprising:

forming a body; and

positioning a member in the body, the member having a first end and a second end, the member having a tapered portion between the first and second ends.

48. A method of making a fusion implant for insertion between adjacent bony structures in load bearing arrangement, the method comprising:

forming a body having opposing sides for contacting the adjacent bony structures; and

positioning a member in the body, the member having a first end and a second end, the member extending only partway through the body.

49. A method of making a fusion implant for insertion between adjacent bony structures in load bearing arrangement, the method comprising:

forming a body having first and second opposing sides for contacting the adjacent bony structures; and

positioning at least one member in the body extending from each of the first and second opposing sides partway toward the other opposing side, a portion of the at least one member extending from each side overlying a portion of the at least one member extending from the opposite side, the overlying portions being spaced from one another such that a predetermined amount of load induced subsidence of the members is permitted relative to each other within the body.